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(30) Priority Date: <b>July 21, 1986 Country:DE No.: 3624587</b>	(71) Applicants: <b>Siemens Aktiengesellschaft Berlin and Munich Wittelsbacherplatz 2 D- 8000 Munich 2 (DE)</b>
(43) Date of Publication of the Application: <b>January 27, 1988 Patent Bulletin 88/04</b>	Applicant: <b>MICHAEL HUBER MÜNCHEN GMBH Feldkirchener Strasse 15 D- 8011 Kirchheim-Heimstetten (DE)</b>
(84) Designated Contracting States: <b>CH, DE, ES, FR, GB, IT, LI, NL, SE</b>	(72) Inventors: <b>Arthur Melnitzki Münchbergstrasse-7a D-8000 Munich 90 (DE)</b>  <b>Dipl.-Ing. FH Alexander Grossmann Gebelestrasse 22 D-8000 Munich 80 (DE)</b>  (74) Agent: <b>Dipl.-Ing. Ernst Mehl et al Postfach 22 01 76 D-8000 Munich 22 (DE)</b>

**(54) PIGMENTED LACQUER FOR PRINTING SYSTEMS**

(57) To print on a dark background of plastic or metal surfaces, a pigmented, preferably white, lacquer is used, which can be processed in ink jet printing systems. To prevent the pigments from becoming firmly stuck in the printing head or in the reservoir container within a limited duration of use (for example, one week), special, surface treated, white pigments, for example, rutile, are provided with a dispersion and antideposition agent. Furthermore, radical polymerizable monomers are added to this mixture, and glycols or derivatives and surfactants are added as solvents.

## **Pigmented Lacquer for Printing Systems**

The invention relates to pigmented, bright, preferably white lacquer for printing systems, particularly ink jet printing systems, to print on a dark background, for example, in the form of plastic or metal surfaces.

The problem which is the basis of the invention is the fact that a sufficient quantity of color pigments must be suspended in a fluid so that the pigments are not deposited in the printing head or in the reservoir container for a duration of use of, for example, one week. To achieve a sufficient covering strength, approximately 5-20 wt% pigments have to be suspended.

The problem has not been solved to date, because, even after a short period of not using the printing system, the use of known lacquers results in deposition of the pigments and clogging of the nozzles. Even using a bright color yellow, for example, as a mixture of white pigment and a yellow, organic color pigment, it was not possible to prevent the deposition of pigments even after a short time in the printing head and in the reservoir container.

The invention is based on the problem of manufacturing the pigmented lacquer mentioned in the introduction. This lacquer should adhere well to nearly all plastic surfaces, such as, for example, polyester, polyimide, polyethylene, polystyrene, polysulfone, ABS, PVC, and dry within 30-60 seconds at room temperature. The same applies to metal surfaces.

The problem which is the basis of the invention is solved by the characterizing portions of the claims. Surface treated titanium oxide here refers to a special treatment with organic silicon compounds.

The surface treated titanium dioxide pigment is used at a particle size of, for example,  $<5 \mu\text{m}$ . Suitable dispersion and antideposition agents are, for example, modified castor bean oil and so-called pyrogenic silicic acid, used in a concentration range of 0-5 wt%.

To ensure adhesion to the surface, radical polymerizable monomers, such as acrylates, styrene, divinylbenzene, and vinyl acetate are added at a concentration of 1-15 wt%.

For the setting of the surface tension and of the viscosity, glycols, for example, ethyl glycol or butyl glycol, or mixtures thereof, for example, ethyl glycol acetate, are admixed as solvents. Their proportion is 45-90 wt%. Moreover, it is possible to consider using alcohols from ethanol to hexanol. Suitable surfactants are, for example, titanium acid ester in a range of 0-0.5 wt%.

The lacquer according to the invention satisfies the following values of acceptance:

Viscosity:  $24 \pm 1$  sec in the 3 mm flow cup based on DIN 53211.

Surface tension:  $29 \pm 0.5 \text{ mN/m}$ .

The following properties were achieved with the lacquer according to the invention: The printing is resistant against scratching with a fingernail. Printing on cables, for example, on PVC,

is resistant against abrasion under a load of 500 g in the presence of oil, gasoline, or a 10% washing agent solution.

#### Embodiment example

The lacquer consists of the following components (parts by weight):

5-20 TiO<sub>2</sub> (rutile), surface treated

1-15 soluble acrylate

0-5 dispersion and antideposition agents

45-90 glycols and their derivatives

0-5 surfactants

#### **Claims**

1. Pigmented, bright, preferably white, lacquer for printing systems, particularly ink jet printing systems, for printing on a dark background, for example, made of plastic or metal surfaces, **characterized in** that surface treated color pigments (preferably white color pigments) are mixed with a dispersion and antideposition agent, radical polymerizable monomers are added, and glycols or their derivatives and surfactants are admixed as solvents.

2. Lacquer according to Claim 1, **characterized in** that, as surface treated white pigments, titanium dioxide (rutile), magnesium oxide or barium sulfate at a particle size of <5 µm are used, for example.

3. Lacquer according to Claim 1, **characterized in** that, as dispersion and antideposition agent, modified castor bean oil and/or pyrogenic silicic acid is used, for example.

4. Lacquer according to Claim 1 **characterized in** that, as radical polymerizable monomers, acrylates, styrene, divinylbenzene or vinyl acetate are used.

5. Lacquer according to Claim 1, **characterized in** that, as solvent, ethyl glycol, butyl glycol or ethyl glycol acetate, or alcohols from ethanol to hexanol, are admixed as solvents.

6. Lacquer according to Claim 1, **characterized in** that, as surfactants, titanium acid ester is used, for example.

7. Lacquer according to Claim 1, **characterized in** that the individual components are mixed together as follows with the following parts by weight:

5-20 TiO<sub>2</sub> rutile, surface treated

1-15 soluble acrylate

0-5 dispersion and antideposition agents

45-90 glycols and their derivatives  
0-5 surfactants.



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### EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	US-A-4 228 438 (BELL TELEPHONE)		C 09 D 11/00
A	US-A-4 680 058 (HITACHI)		
A	FR-A-2 537 987 (PILOT INK.)		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			C 09 D
The present search report has been drawn up for all claims.			
Place of search THE HAGUE		Date of completion of the search April 27, 1989	Examiner BUSCAGLIONE Y.
<b>CATEGORY OF CITED DOCUMENTS</b> X: Particularly relevant if taken alone. Y: Particularly relevant if combined with another document of the same category. A: Technological background. O: Non-written disclosure. P: Intermediate document. T: Theory or principle underlying the invention. E: Earlier patent document, but published on, or after the filing date. D: Document cited in the application. L: Document cited for other reasons. ..... &: Member of the same patent family, corresponding document.			

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